~~a transfer step of transferring the one word of data stored in the one~~
address region within the second storage means to the printhead so as to drive the print ~~elements according to the one~~ word of data.

REMARKS

In the above-identified Office Action the Examiner again rejected all of the claims as being anticipated by the previously cited Oda reference. By this response, however, most of the claims have been revised to stress more clearly the patentable distinctions over the Oda reference and it is believed that all of the claims in the case are now in condition for allowance.

In particular, the broad term "storage means" has been changed in all but new Claim 20 so that the claims now refer to the more specific "editing buffer" and "printing buffer", the concept of which, as recited in the claims, are not disclosed in Oda.

More specifically, in accordance with the invention as now claimed, one word of data corresponds to a plurality of contiguous print elements provided on the printhead. That data is stored divisionally in two or more address regions in an editing buffer, and is rearranged in one address region in a print buffer. Thus, after a horizontal-to-vertical conversion step, the one word of data is stored in one address region and transferred to the printhead so as to drive the print elements according to the one word of data.

By these means, the apparatus of the present invention can read one word (e.g. 8-bits) of data from the one address region in the print buffer, transfer all of that data to the printhead and effectively drive the printhead by the one word of data.

In the cited Oda reference, there is disclosed an image recorder having a 4-bit shift register unit that temporarily stores the print data of the print buffer and sequentially supplies the print data for each dot to the printing elements. Oda also discloses a horizontal-to-vertical conversion step in Col. 4, line 61 - Col. 5, line 26. However, while Oda discloses a shift register, Applicant submits that such reference does not disclose the claimed editing buffer of Applicants' invention. Moreover, Oda does not disclose the rearranging step, after the horizontal-to-vertical conversion step, as set forth in amended Claim 1 and new Claim 20.

For all of these various reasons, Applicant respectfully submits that all of the pending claims are allowable over Oda, wherefor a formal Notice of Allowance is solicited.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.
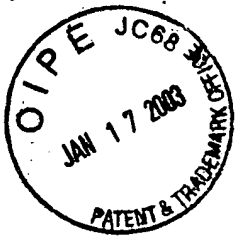
Respectfully submitted,

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VERSION MARKED TO SHOW CHANGES TO CLAIMS

IN THE CLAIMS:

Please cancel Claim 17.

Please amend Claims 1-9, 12, 14 and 18, and add new Claims 19 and 20, to

read as set forth below, wherein all of the pending claims are presented. A version of the

amended claims, marked to show the changes, is appended.

1.   (Twice Amended) A data processing method for processing data

[stored in storage means] in an image printing apparatus subjected to time-division drive of

a printhead, said apparatus having an editing buffer and a print buffer, comprising [a] the

steps of:

rearranging one word of data corresponding to a plurality of

contiguous print elements provided on the printhead, that is stored divisionally in two or

more address regions in the editing buffer, and storing [storage means, to store] the data in

one address region in the print buffer [storage means].

2.   (Twice Amended) [A data processing apparatus for processing data

stored in storage means in an] An image printing apparatus subjected to time-division drive

of a printhead, comprising an editing buffer and a print buffer, wherein one word of data

corresponding to a plurality of contiguous print elements provided on the printhead, that is

stored divisionally in two or more address regions within the editing buffer [storage

means], is rearranged in one address region within the [storage means] print buffer.

3.   (Twice Amended) The apparatus according to claim 2, further

comprising:

delay means for delaying a set of data that corresponds to contiguous

print elements, a number of which is a whole-number multiple of a number of time

divisions employed in time-division drive, said delayed data being from the data that has

been read out of said [storage means] editing buffer.

4.   (Amended) The apparatus according to Claim 3, wherein storage

means for a horizontal-to-vertical conversion is used as said [first storage means] print

buffer.

5.   (Twice Amended) An image printing apparatus subjected to

time-division drive in which n represents the number of time divisions and one word is

composed of m bits, comprising:

data processing means for reading n-bit data corresponding to n

contiguous nozzles serves as one unit from an editing buffer and storing contiguous 1-bit

data, where the lowest common multiple of n and m is 1, in one address within a print

buffer.

6.   (Twice Amended) An image printing apparatus for processing data

in which one word consists of eight bits, comprising:

printhead driving means for discharging ink from four contiguous

nozzles of a printhead at different timings;

an editing buffer;

a print buffer for outputting image data to said printhead driving

means; and

data transfer means for reading data from said editing buffer and

transferring data to said print buffer;

said data transfer means rearranging sets of 4-bit data, each set of

which corresponds to four contiguous nozzles of the printhead, in such a manner that two

sets of data are stored in one address within said print buffer as 8-bit data.

7.   (Twice Amended) An image printing apparatus subjected to

time-division drive, comprising:

[storage means] an editing buffer and a print buffer for storing image

data;

a printhead for performing printing based upon the image data read

out of said [storage means] print buffer; and

means for reading image data from two or more address regions

within said [storage means] editing buffer, which will be printed by driving said printhead

one time, and packing the image data in numbers of bits serving as units in which data is

read from and written to said [storage means] editing buffer to store the packed image data

in one address region within said [storage means] print buffer, before the image data is

transmitted to said printhead.

8.   (Twice Amended) A method of controlling an image printing

apparatus subjected to time-division drive and having an editing buffer and a print buffer

[storage means] for storing image data and a printhead for performing printing based upon

the image data read out of said print buffer [storage means], said method comprising a

steps of:

reading image data from two or more address regions within said

editing buffer [storage means], which will be printed by driving said printhead one time;

and,

packing the image data in numbers of bits serving as units in which

data is read from and written to said editing buffer [storage means] to store the packed

image data in one address region within said <u>print buffer</u> [storage means], before the image

data is transmitted to said printhead.

        9.   (Twice Amended) A computer-readable memory

storing a control program for controlling an image printing apparatus subjected to time-

division drive and having <u>an editing buffer and a print buffer</u> [storage means] for storing

image data and a printhead for performing printing based upon the image data read out of

said <u>print buffer</u> [storage means], said control program being a program for:

        reading image data from two or more address regions within said

<u>editing buffer</u> [storage means], which will be printed by driving said printhead one time;

and,

        packing the image data in numbers of bits serving as units in which

data is read from and written to said <u>editing buffer</u> [storage means] to store the packed

image data in one address region within said <u>print buffer</u> [storage means], before the image

data is transmitted to said printhead.

        12.   (Twice Amended) A data processing method for processing data

[stored in a print buffer] in an image printing apparatus which performs printing by causing

a printhead to scan, said printhead having a plurality of print elements arrayed at

predetermined angles with respect to the scanning direction of the printhead and subjected

to time-division drive, comprising a step of:

rearranging one word of data corresponding to a plurality of

contiguous print elements provided on the printhead, that is stored in two or more address

regions in an editing buffer [the storage means], to store the data in one address region in a

print buffer [the storage means].

14.   (Twice Amended) A data processing apparatus for processing data

[stored in a print buffer] in an image printing apparatus which performs printing by causing

a printhead to scan, said printhead having a plurality of print elements arrayed at

predetermined angles with respect to the scanning direction of the printhead and subjected

to time-division drive, wherein one word of data corresponding to a plurality of contiguous

print elements provided on the printhead, that is stored divisionally in two or more address

regions within an editing buffer [the storage means], is rearranged in one address region

within a print buffer [the storage means].

18.   (Amended) The apparatus according to claim 2, comprising:

first register for storing a whole-number multiple of one word of

data which is read from two or more address regions within the editing buffer; and,

a second register for storing a set of data that corresponds to

contiguous print elements, a number of which is a whole-number multiple of a number of

time divisions employed in time-division drive.